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the author is so far constrained, from motives of prudence in dealing with scientific names to the uninitiated as to use "back-boned animals" for vertebrates, and the term "suck-giving" for mammalian, why does he take away the layman's breath by proposing the term *hexicology*, when we are only just getting used to the much better term environment?

But notwithstanding the formidable name at the head of the chapter, the essay itself is quite interesting, and serves to introduce us to the more valuable and interesting one on the pedigree and origin of the cat. In this essay all that has been learned of the cat's structure and development, and of cats and carnivora in general, is brought to bear upon the question of the origin of the species, and family, and order. In answer to these questions, the author, adopting the results of French and American palæontologists, states his belief that the cat has originated from the cheetah, and the Felidæ in general from some Viverrine animal, while the carnivora may have descended from *Arctocyon*, the oldest Tertiary mammal, and contrary to the views of some, our author derives the carnivora from the insectivora, rather than the marsupials. As to the method of evolution, Mivart stands out from most other English evolutionists as a believer in sudden or saltatory evolution as well as slow, gradual development of species, his views in a general way agreeing with those of several American writers on this subject. This last chapter is certainly an able and interesting discussion, and the entire volume is the work of an expert comparative anatomist, and of a strong, able, facile writer.

THOMAS' FIFTH REPORT ON THE INJURIOUS INSECTS OF ILLINOIS.¹—In its typographical appearance, as well as general usefulness to the farmer or gardener, and interest to the entomologist, this report appears to us to be somewhat in advance of its predecessors. The longest article is on the army worm, and is a critical discussion of known facts regarding its natural history, some points of which still remain to be cleared up. Professor Thomas suggests as the result of his meteorological studies in connection with this insect and the chinch bug, that two favorable seasons are necessary to develop these insects in injurious numbers. The time is coming when by a study of climatic changes, we shall be able to predict, with some degree of certainty, the coming of injurious insects. This has already been in part worked out as regards the Rocky Mountain locust, and in this connection the suggestions and facts in the chapter of the present report on "the relation of meteorological conditions to insect development" is timely and valuable. Enough is now known of the periodicity in life of the more injurious insects to indicate that the Hessian

¹ *Tenth Report of the State Entomologist on the Noxious and Beneficial Insects of the State of Illinois*. Fifth Annual Report by CYRUS THOMAS, Ph.D., State Entomologist. Springfield, 1881. 8vo, pp. 244.

fly is most abundant in rather wet and moderately warm seasons ; while warmth appears to be the chief element in developing the Aphides or plant lice, some species being more favored by a humid atmosphere, while others develop more rapidly in a dry season. "The cut-worms are developed more abundantly in such seasons as increase the army-worms, which in their normal habits are but cut-worms, massing in armies and migrating being really an abnormal condition in their history. Observation shows, as heretofore stated, that, as a general rule, those species which occasionally develop in such vast numbers require for this purpose two consecutive seasons, though the character of the seasons for the different species differ somewhat. That is to say, those which bring out one species are not the ones which bring out another. As examples of the correctness of this statement I have only to refer to the migratory locusts, the chinch bug, as heretofore shown, the Hessian fly, the army-worm, etc. The locust and the chinch bug require the same kind of seasons, that is, two successive dry years, the latter warm as well as dry ; consequently, when two such seasons prevail generally over the Northwest, both species are apt to appear, as was the case in 1874. But the case is different with the army-worm. This requires a dry summer and fall, and I am inclined to believe also a dry winter, followed by a cool and rather damp and cloudy spring. The two most noted years of its appearance in this State were 1861 and 1875, each of which followed a preceding dry year, but in neither case was the year in which it appeared warm, 1861 being one of average temperature, and 1875 rather cold. The latter, which is the only one for which we have the records of the different seasons, was more than usually damp in the spring and summer." Some meteorological tables are given in illustration.

These chapters are followed by a descriptive catalogue of larva ; that of the caterpillars of butterflies being compiled by Miss Nettie Middleton, that of the Sphingidæ, *Ægeridæ* and *Bombycidæ* by Mr. John Marten, while a chapter giving original notes on caterpillars is contributed by M. D. W. Coquillett. The Report closes with a reprint of Bulletin 4 of the U. S. Entomological Commission on the Hessian fly, by A. S. Packard, Jr.

WALCOTT ON THE ORGANIZATION OF TRILOBITES.¹—In this essay Mr. Walcott brings together the results of much patient labor in preparing sections and studying them with a view to settle the vexed question as to the nature of the limbs of the trilobite. The results are as follows : No antennæ have been discovered ; but "four pairs of manducatory jaws, formed by the basal joints of the four anterior pairs of appendages," which "have a general structure similar to the cephalic legs of *Limulus* and *Eurypterus*."

¹ *The Trilobite*: New and old evidence relating to its organization. By C. D. WALCOTT. Bulletin of the Museum of Comparative Zoology at Harvard College, Vol. VIII, No. 10. Cambridge, March, 1881.